Center Independent Research & Development: GSFC IRAD

W-band Solid State Transceiver for Cloud Radar (CRS)

Completed Technology Project (2013 - 2014)

Project Introduction

This proposed effort seeks to develop a solid state power amplifier (SSPA)-based W-band cloud radar transceiver and demonstrate it on the GSFC airborne Cloud Radar System (CRS). Compared to the current Klystron-based W-band transceiver, this solid state transceiver will be significantly more compact in size, lower weight with improved reliability since it does not require high-voltages.

The proposed work focuses on the evaluation and testing of the W-band SSPA on the current airborne Cloud Radar System (CRS) transceiver so that it can be operated with either the original Klystron-based transmitter, or the SSPA. We will swap in either transmitter to maintain the current EIK capability. As we gain more confidence in the SSPA-based transmitter, we will migrate entirely to this approach. This SSPA-based transceiver will enable the usage a number of recently developed radar techniques, such as advanced versatile Tx/Rx waveform, ultra-low sidelobe pulse compression, and frequency diversity. It is necessary to modify the hardware and firmware in order to accommodate the above new techniques. Recent advances to HIWRAP's advanced waveform generation need to be transferred to CRS to take full advantage of the SSPA. The resulting work is readily applicable to upcoming cloud and precipitation radar spaceborne missions.

Anticipated Benefits

ACE, CAPPM

GPM Ground Validation

DOE

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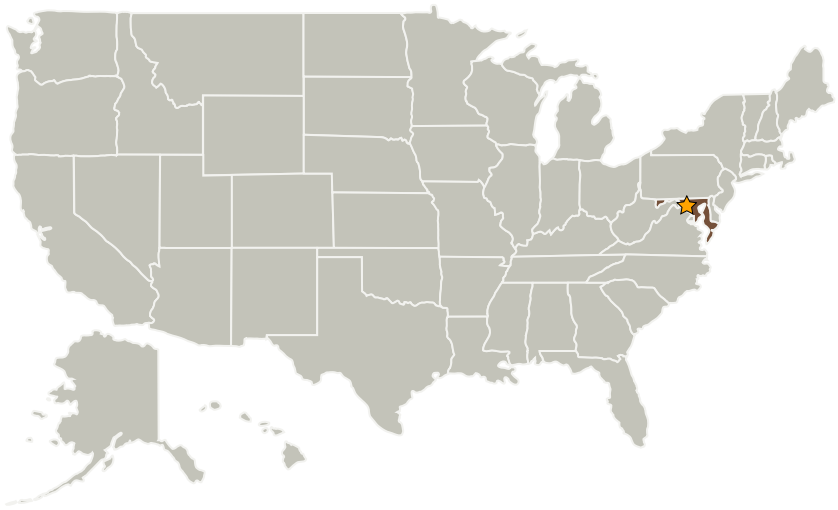
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

Co-Funding Partners	Type	Location
Quinstar Technology, Inc	Industry Small Disadvantaged Business (SDB)	Torrance, California

Primary U.S. Work Locations
Maryland

Project Website:

http://sciences.gsfc.nasa.gov/sed/

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Center Independent Research & Development: GSFC IRAD

Project Management

Program Manager:

Peter M Hughes

Project Manager:

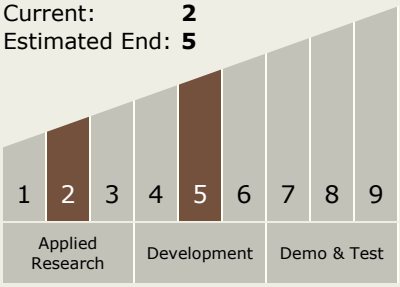
Matthew J Mcgill

Principal Investigator:

Gerald M Heymsfield

Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **5**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves